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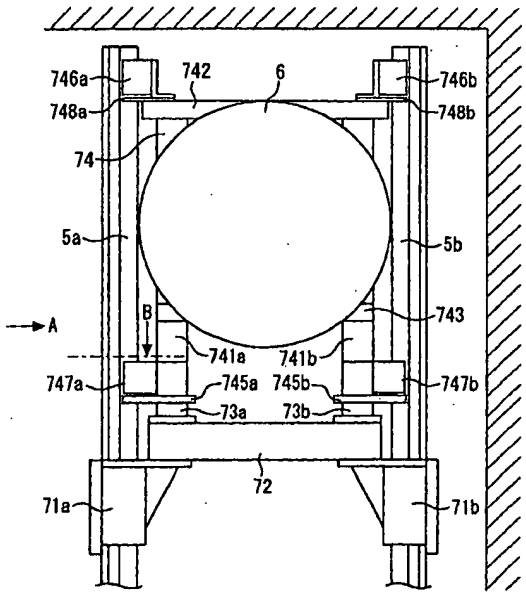
(54) MECHANISM FOR FIXING HOIST AND ELEVATOR

(57) A mechanism for mounting a hoisting machine according to the invention includes guide rails 5a, 5b for guiding vertical movement of a counterweight; a hoisting machine 6 having a traction sheave 61 around which a main cable 10 is to be wound and a drive section 62 for rotationally driving the traction sheave 61; a mount frame 74 on which the hoisting machine 6 is secured; bracing members 746a, 746b which are provided on the mount member 74, retain the mount member in such a manner that the mount member is slidable in a longitudinal direction of the guide rails 5a, 5b, and prevent horizontal runout of the mount member; and support members 71a, 71b which are provided on the guide rails 5a, 5b and support vertical load of the mount member 74 and that of the hoisting machine 6.

Fig. 2



EP 1 380 530 A1

Description

Field of the Invention

[0001] The present invention relates to an elevator system in which a hoisting machine is to be installed within a hoistway, as well as to a mounting mechanism for mounting onto guide rails the hoisting machine to be installed in the hoistway.

Background Art

[0002] Fig. 10 is a view showing a conventional elevator system described in Japanese Patent Application Laid-Open No. 208152/1996.

[0003] As shown in the drawing, reference numeral 1 designates a hoistway; 2 designates a car which is hoisted and lowered within the hoistway; 3 designates car guide rails provided on either side of the car 2 for guiding ascending and descending actions of the car 2; 4 designates a counterweight which moves up and down in the direction opposite the moving direction of the car 2; and 5 designates counterweight guide rails for guiding ascending and descending actions of the counterweight.

[0004] Reference numeral 6 designates a hoisting machine which acts as a power source for causing the car 2 and the counterweight to move up and down. The hoisting machine 6 has a traction sheave 61 around which a main cable to be described later is to be wound; and a drive section 62 including a motor for rotating the traction sheave.

[0005] Reference numeral 8 designates a counterweight pulley fastened to an upper portion of the counterweight 4; and 9 designates an undercar pulley provided on a lower portion of the car 2. Two undercar pulleys 9 are provided on the lower portion of the car 2.

[0006] Reference numeral 10 designates a main cable passed around the counterweight pulley 8, the traction sheave 61, and the undercar pulleys 9. The respective ends of the main cable are anchored to the ceiling of the hoistway or a beam provided in an elevated position within the hoistway.

[0007] Reference numeral 20 designates a beam affixed to the tops of the counterweight guide rails 5, and the hoisting machine 6 is mounted on the beam 20.

[0008] Reference numeral 21 designates a reinforcement element for clamping the hoisting machine 6 on a wall of the hoistway 1. This reinforcement element 21 absorbs horizontal force but absorbs substantially no vertical supporting force.

[0009] The conventional elevator system is constructed in the manner mentioned previously. The car 2 and the counterweight 4 move up and down by way of the main cable 10 as a result of rotation of the traction sheave 61 of the hoisting machine 6.

[0010] In such a conventional elevator system, the hoisting machine 6 is mounted on the beam 20 in the manner as shown in Fig. 11. At this time, in order to prevent the main cable 10 from coming into contact with the guide rails 5, the traction sheave 61 is offset from a plane in which two guide rails 5 are provided, when viewed from the side. Therefore, because of the force F exerted on the traction sheave 61 by the main cable 10, a very large moment acts on the hoisting machine 6. The moment imposes bending force on the counterweight guide rails 5. Therefore, there arises a problem of a necessity for increasing the size of rails for enhancing the strength thereof.

[0011] Moreover, in order to prevent horizontal deflection of the hoisting machine 6, which would otherwise be caused by the force F, there arises a necessity for a reinforcement element for fastening the hoisting machine 6 to the wall of the hoistway 1.

Diclosure of the Invention

[0012] The present invention has been conceived to solve such a problem, and a first object of the invention is to reduce bending force which is caused to arise in guide rails by force acting on a traction sheave and to reduce the size of the guide rails. A second object of the invention is to prevent horizontal deflection of a hoisting machine without involvement of fastening of the hoisting machine to a wall of a hoistway 1.

[0013] A mechanism for mounting a hoisting machine according to the present invention comprises a first guide rail and a second guide rail for guiding vertical movement of a car or that of a counterweight; a hoisting machine having a traction sheave around which a main cable is to be wound and a drive section for rotationally driving the traction sheave; a mount member on which the hoisting machine is secured; a first bracing member which is provided on the mount member, retains the mount member in such a manner that the mount member is slidable in a longitudinal direction of the first guide rail, and prevents horizontal runout of the mount member; a second bracing member which is provided on the mount member, retains the mount member in such a manner that the mount member is slidable in a longitudinal direction of the second guide rail, and prevents horizontal runout of the mount member; and support members which are provided on the first and second guide rails and support vertical load of the mount member and that of the hoisting machine.

[0014] The mechanism for mounting a hoisting machine further comprises a third bracing member which is provided on a part of the mount member at a lower side of the first bracing member, retains the mount member in such a manner that the mount member is slidable in the longitudinal direction of the first guide rail, and prevents horizontal runout of the mount member; and a fourth bracing member which is provided on a part of the mount member at a lower side of the second bracing member, retains the mount member in such a manner that the mount member is slidable in the longitudinal di-

rection of the second guide rail, and prevents horizontal runout of the mount member.

[0015] The mechanism for mounting a hoisting machine further comprises resilient members provided between the mount member and the support member.

[0016] Further, the mechanism for mounting a hoisting machine comprises a beam which is affixed to the support member and to which one end of the main cable is to be affixed.

[0017] The mechanism for mounting a hoisting machine further comprises a first stopper which is provided so as to project from the mount member toward the first guide rail and prevents horizontal runout of the mount member upon coming into contact with the first guide rail; and a second stopper which is provided so as to project from the mount member toward the second guide rail and prevents horizontal runout of the mount member upon coming into contact with the second guide rail.

[0018] The mechanism for mounting a hoisting machine further comprises a joint member which is provided on an upper end of the first guide rail and that of a second guide rail and links together the first and second rails at a position higher than the mount member.

[0019] An elevator system according to the present invention comprises a car which moves up and down within a hoistway; a plurality of car guide rails for guiding vertical movement of the car; a counterweight which moves up and down within the hoistway; a plurality of counterweight guide rails for guiding vertical'movement of the counterweight; a main cable for suspending the car and the counterweight; a hoisting machine having a traction sheave around which the main cable is to be passed and a drive section for rotationally driving the traction sheave and causing the car and the counterweight to ascend and descend by way of the main cable by means of rotation of the traction sheave; a mount member on which the hoisting machine is mounted; a first bracing member which is mounted on the mount member, retains the mount member in such a manner that the mount member is slidable in a longitudinal direction of the first guide rail selected from the plurality of car guide rails and the plurality of counterweight guide rails and which prevents horizontal runout of the mount member; a second bracing member which is mounted on the mount member, retains the mount member in such a manner that the mount member is slidable in a longitudinal direction of a second guide rail differing from the first guide rail selected from the plurality of car guide rails and the plurality of counterweight guide rails and which prevents horizontal runout of the mount member; and a support member which is mounted on the first and second guide rails and supports a vertical load of the mount member and that of the hoisting machine.

Brief Description of the Drawings

[0020]

Fig. 1 is an overall layout view of an elevator system according to a first embodiment;
Fig. 2 is an enlarged view showing the structure of surroundings of a mounting mechanism 7;
Fig. 3 is a side view of the mounting mechanism 7 when viewed from direction A shown in Fig. 2;
Fig. 4 is a view showing the construction of a mount frame 74, wherein (a) is a front view of the mount frame 74; (b) is a side view of the mount frame 74; and (c) is a bottom view of the mount frame 74;
Fig. 5 is an enlarged view showing the structure of an upper bracing member 746a, wherein (a) is a front view of the upper bracing member 746a, and (b) is a top view of the upper bracing member 746a;
Fig. 6 is an enlarged view showing the structure of a lower bracing member 747a, or a cross-sectional view of the same when viewed from direction B shown in Fig. 2;
Fig. 7 is an enlarged view showing the structure of surroundings of another mounting mechanism 7;
Fig. 8 is a top view of a guide rail joint section 13;
Fig. 9 is a view showing another structure of the guide rail joint section 13;
Fig. 10 is an overall structural drawing of a conventional elevator system; and
Fig. 11 is a view showing a force F acting on a hoisting machine 6.

Best Modes for Implementing the Invention

[0021] In relation to the invention, embodiments will be described hereinbelow.

First Embodiment

[0022] Fig. 1 is an overall layout view of an elevator system according to an embodiment.

[0023] As shown in Fig. 1, reference numeral 1 designates a hoistway; 2 designates a car which moves up and down within the hoistway 1; and 3a, 3b designate car guide rails provided on respective sides of the car 2 for guiding vertical movement of the car 2.

[0024] Reference numeral 4 designates a counterweight which moves up and down within the hoistway in the direction opposite the moving direction of the car 2. Reference numerals 5a, 5b designate counterweight guide rails provided on respective sides of the counterweight 4 for guiding vertical movement of the counterweight 4.

[0025] Reference numeral 6 designates a hoisting machine, which serves as a power source for causing the car 2, and the counterweight 4 to ascend and descend. The hoisting machine 6 has a traction sheave 61 around which a main cable to be described later is to be

wound; and a drive section 62 including a motor for rotating the traction sheave 61.

[0026] Reference numeral 7 designates a mounting mechanism for mounting the hoisting machine 6 between the guide rails 5a, 5b. The present embodiment is characterized by the mounting mechanism 7, and the mounting mechanism will be described in detail later.

[0027] Reference numeral 8 designates a counterweight pulley attached to an upper portion of the counterweight 4.

[0028] Reference numeral 9 designates an undercar pulley attached to a lower portion of the car 2 . Two undercar pul leys 9 are provided on the lower portion of the car 2.

[0029] Reference numeral 10 designates a main cable passed around the counterweight pulley 8, the traction sheave 61, and the undercar pulleys 9. One end of the main cable 10 is anchored to a main cable attachment section 11 provided at the upper end of the guide rail 3a. The other endof themain cable 10 is anchored to a main cable attachment section 12 interposed between the guide rails 5a, 5b.

[0030] Since the counterweight pulley 8 is disposed at a position offset from a plane in which the guide rails 5a, 5b are placed, when viewed from the front, the main cable 10 can be routed from the traction sheave 61 to the counterweight 8 and anchored to the main cable attachment section 12.

[0031] In the elevator system, the car 2 and the counterweight 4 are caused to ascend or descend by way of the main cable 10 as a result of rotation of the traction sheave 61 of the hoisting machine 6.

[0032] Next, the structure of the mounting mechanism 7 will be described in detail.

[0033] Fig. 2 is an enlarged view showing the structure of the mounting mechanism 7, and Fig. 3 is a side view of the structure shown in Fig. 2. The structure of the mounting mechanism will now be described by reference to these drawings.

[0034] The mounting mechanism 7 comprises support tables 71a, 71b; a cable anchor beam 72; resilient members 73a, 73b; and a mount frame 74 serving as a mount member.

[0035] The support tables 71a, 71b are attached to the guide rails 5a, 5b, respectively. One end of the cable anchor beam 72 is fixed to the support table 71a, and the other end of the same is fixed to the support table 71b. The main cable mount section 12 is provided on the cable anchor beam 72.

[0036] The resilient members 73a, 73b are attached onto the cable anchor beam 72 and formed from elastic material such as rubber. The mount frame 74 of the hoisting machine is set on the resilient members 73a, 73b. The hoisting machine 6 is mounted to the mount frame 74, and the mount frame 74 can be moved minutely in the longitudinal direction (i.e., the vertical direction) of the guide rails 5a, 5b.

[0037] As shown in Fig. 3, the hoisting machine 6 is mounted on the mount frame 74. In order to prevent the main cable 10 from coming into contact with the guide rails 5a, 5b and the counterweight 4, as shown in Fig. 3 the traction sheave 61 (designated by dotted lines) is placed at a position offset from the plane in which the guide rails 5a, 5b are present.

[0038] As shown in Fig. 4, the mount frame 74 is constituted of lateral members 742, 743 and longitudinal members 741a, 741b. An anchor block 744a is attached to the longitudinal member 741a, and an anchor block 744b is attached to the longitudinal member 741b. The hoisting machine 6 is secured to the lateral member 742 and the anchor blocks 744a, 744b.

[0039] A lower stopper 745a is attached to the lower end of the longitudinal member 741a, and a lower stopper 745b is attached to the lower end of the longitudinal member 741b. As shown in Fig. 2, a lower end face of the longitudinal member 741a remains in contact with the resilient member 73a, and a lower end face of the longitudinal member 741b remains in contact with the resilient member 73b.

[0040] Further, as shown in Fig. 2, upper bracing members 746a, 746b are attached to respective sides of the lateral member 742. Further, a lower bracing member 747a is attached to the longitudinal member 741a, and a lower bracing member 747b is attached to the longitudinal member 741b.

[0041] Figs. 5 and 6 are enlarged views of the upper bracing member 746a and the lower bracing member 747a.

[0042] As shown in Figs. 5 and 6, the upper bracing member 746a and the lower bracing member 747a catch the guide rail 5a by way of the resilient members. The upper bracing member 746b and the lower bracing member 747b are identical in construction with the upper bracing member 746a and the lower bracing member 747a and catch the guide rail 5b by way of the resilient members. By means of such a construction, minute horizontal deflections of the hoisting machine 6 can be prevented. Moreover, by means of the foregoing construction, the mount frame 74 is guided by. the guide rails 5a, 5b and can move minutely in the downward direction. Hence, the vertical force exerted on the hoisting machine 6 is supported by the support tables 71a, 71b.

[0043] An upper stopper 748a is provided on one side of the lateral member 742 so as to project toward the guide rail 5a, and an upper stopper 748b is provided on the other side of the lateral member 742 so as to project toward the guide rail 5b (here, the portions of the upper bracing members 746a, 746b attached to the lateral member 742 may work as the upper stoppers). The upper stoppers 748a, 748b prevent horizontal deflections which cannot be inhibited by the bracing members, in conjunction with the lower stoppers 745a, 745b. Even when large deflections arise as a result of moment having acted on the hoisting machine 6, horizontal deflections of the mount frame 74 can be prevented by contact existing between the upper stopper 748a, the lower

stopper 745a, and the guide rail 5a and contact existing between the upper stopper 748b, the lower stopper 745b, and the guide rail 5b.

[0044] By means of such a construction, even when the main cable 10 has exerted downward force F on the hoisting machine, the moment due to the force F can be supported by the upper stoppers 748a, 748b and the lower stoppers 745a, 745b in a distributed manner. On the other hand, normal load of the mount frame 74 and that of the hoisting machine 6 acts on the support tables 71a, 71b, and the loads are supported.

[0045] As a result, moment due to the reaction force acting on the guide rails 5a, 5b can be reduced, thereby allowing downsizing of the guide rails.

[0046] Since the resilient members 73a, 73b are sandwichedbetween the mount frame 74 and the cable anchor beam 72, transmission of vibrations of the hoisting machine to the guide rails 5a, 5b can be inhibited. There may be a case where minute horizontal runout arises in the mount frame 74 for reasons of deflections of the resilient members 73a, 73b. Such horizontal runout can be prevented by the upper bracing members 746a, 746b and the lower bracing members 747a, 747b.

[0047] According to the mounting structure of the hoisting machine, the hoisting machine 6 is provided between the guide rails 5a, 5b. The space defined between the guide rails 5a, 5b has hitherto been taken as a dead space. Utilization of this space leads to effective utilization of a space in the hoistway.

[0048] The cable anchor beam 72 is secured on the support tables 71a, 71b. Hence, the positional relationship between the hoisting machine 6 and the cable anchor beam 72 does not require adjustment.

[0049] In the case of the conventional example, a beam is provided on the guide rails 5a, 5b, and the hoisting machine is situated on the beam, thus requiring a heightwise dimension. In contrast, the present embodiment obviates a space corresponding to the dimension.

Second Embodiment

[0050] Fig. 7 is an enlarged view of the mounting mechanism according to a second embodiment.

[0051] This embodiment differs from the first embodiment in that a guide rail joint section 13 is provided at the upper ends of the guide rails 5a, 5b. In other respects, the embodiment is identical with the previous embodiment, and hence repeated explanations of the remaining elements and their configuration are omitted.

[0052] The guide rail joint section 13 is constructed as follows:

[0053] The back of the guide rail 5a is brought into contact with and fastened to one side of the L-shaped member 131a by a rail clip 132a. The back of the guide rail 5b is brought into contact with and fastened to one side of the L-shaped member 131b by a rail clip 132b. The other side of the L-shaped member 131a and that of the L-shaped member 131b are joined together by means of a mounting bracket 133.

[0054] By means of the guide rail joint section 13, separation of the guide rail 5a from the guide rail 5b can be prevented.

[0055] In the embodiment, the guide rail joint section 13 has the construction as set forth. However, alternatively, the construction shown in Fig. 9 may be adopted. As shown in Fig. 9, one end of a joint member 134a and one end of a joint member 134b are fixed to a projecting section which is a sliding surface of the guide rail 5a. The other end of the joint member 134a and that of the joint member 134b are fixed to a projecting section which is a sliding surface of the guide rail 5b. To this end, a through hole is formed in the upper end portion of the projecting section of the guide rail 5a as well as in a corresponding portion of the guide rail 5b. Bolts are inserted into the through holes, thereby fastening together the joint members 134a, 134b.

[0056] In the first and second embodiments as above, the cable anchor beam 72 is provided on the support tables 71a, 71b. The resilient members 73a, 73b are further provided on the cable anchor beam 72 . However, it may be the case that the cable anchor beam 72 is not interposed between the support tables 71a, 71b and the resilient members 73a, 73b; in this case, the ends of the main cable 10 must be affixed to the ceiling of the hoistway or other locations.

[0057] The hoisting machine 6 may be fixed on the mount frame 74 by way of the resilient members.

[0058] In the embodiment, the support tables 71a, 71b are attached to the guide rails 5a, 5b. A support table may be constructed by use of a beam-like member which is connected at one end thereof to the guide rail 5a and at the other end thereof to the guide rail 5b.

[0059] Although the embodiment has described a case where a hoisting machine is mounted on the counterweight guide rails 5a, 5b, the structure of the invention may be applied to a case where a hoisting machine is mounted on the car guide rails 3a, 3b.

[0060] The structure for mounting a hoisting machine according to the present invention yields the following advantages.

[0061] A mechanism for mounting a hoisting machine according to the invention comprises a first guide rail and a second guide rail for guiding vertical movement of a car or that of a counterweight; a hoisting machine having a traction sheave around which a main cable is to be wound and a drive section for rotationally driving the traction sheave; a mount member on which the hoisting machine is secured; a first bracing member which is provided on the mount member, retains the mount member in such a manner that the mount member is slidable in a longitudinal direction of the first guide rail, and prevents horizontal runout of the mount member; a second bracing member which is provided on the mount member, retains the mount member in such a manner that the mount member is slidable in a longitudinal direction of the second guide rail, and prevents

horizontal runout of the mount member; and support members which are provided on the first and second guide rails and support vertical load of the mount member and that of the hoisting machine. As a result, a bending force, which arises in the guide rails from force acting on the traction sheave, can be diminished, thereby enabling a reduction in the size of the guide rails.

[0062] The mechanism for mounting a hoisting machine further comprises a third bracing member which is provided on a part of the mount member at a lower side of the first bracing member, retains the mount member in such a manner that the mount member is slidable in the longitudinal direction of the first guide rail, and prevents horizontal runout of the mount member; and a fourth bracing member which is provided on a part of the mount member at a lower side of the second bracing member, retains the mount member in such a manner that the mount member is slidable in the longitudinal direction of the second guide rail, and prevents horizontal runout of the mount member. As a result, a bending force, which arises in the guide rails from force acting on the hoisting machine, can be diminished further, thereby enabling a reduction in the size of the guide rails.

[0063] The mechanism for mounting a hoisting machine further comprises resilient members provided between the mount member and the support member. By provision of the resilient members, vibration of the hoisting machine is not transmitted to the guide rails.

[0064] Further, the mechanism for mounting a hoisting machine comprises a beam, which is affixed to the support member and to which one end of the main cable is to be affixed. Hence, positional adjustment of the hoisting machine and that of the beam are obviated.

[0065] The mechanism for mounting a hoisting machine further comprises a first stopper which is provided so as to project from the mount member toward the first guide rail and prevents horizontal runout of the mount member upon coming into contact with the first guide rail; and a second stopper which is provided so as to project from the mount member toward the second guide rail and prevents horizontal runout of the mount member upon coming into contact with the second guide rail. Even if moment, which cannot be supported by the bracing members, is produced by the force acting on the traction sheave, the hoisting machine can be supported.

[0066] The mechanism for mounting a hoisting machine further comprises a joint member which is provided on an upper end of the first guide rail and that of a second guide rail and links together the first and second rails at a position higher than the mount member. As a result, expansion of a space between the first and second guide rails can be prevented, and stiffness of the guide rail can be improved.

[0067] An elevator system according to the invention comprises a car which moves up and down within a hoistway; a plurality of car guide rails for guiding vertical movement of the car; a counterweight which moves up and down within the hoistway; a plurality of counterweight guide rails for guiding vertical movement of the counterweight; a main cable for suspending the car and the counterweight; a hoisting machine having a traction sheave around which the main cable is to be passed and a drive section for rotationally driving the traction sheave and causing the car and the counterweight to ascend and descend by way of the main cable by means of rotation of the traction sheave; a mount member on which the hoisting machine is mounted; a first bracing member which is mounted on the mount member, retains the mount member in such a manner that the mount member is slidable in a longitudinal direction of the first guide rail selected from the plurality of car guide rails and the plurality of counterweight guide rails and which prevents horizontal runout of the mount member; a second bracing member which is mounted on the mount member, retains the mount member in such a manner that the mount member is slidable in a longitudinal direction of a second guide rail differing from the first guide rail selected from the plurality of car guide rails and the plurality of counterweight guide rails and which prevents horizontal runout of the mount member; and a support member which is mounted on the first and second guide rails and supports a vertical load of the mount member and that of the hoisting machine. As a result, a bending force, which is produced in the guide rails by force acting on the traction sheave, can be diminished, thereby enabling a reduction in the size of the guide rails.

Industrial Applicability

[0068] As has been described, the invention is applied to an elevator system in which a hoisting machine is mounted on guide rails.

Claims

1. A mechanism for mounting a hoistingmachine, comprising:

   a first guide rail and a second guide rail for guiding vertical movement of a car or that of a counterweight;
   a hoisting machine having a traction sheave around which a main cable is to be wound and a drive section for rotationally driving the traction sheave;
   a mount member on which the hoisting machine is secured;
   a first bracing member which is provided on the mount member, retains the mount member in such a manner that the mount member is slidable in a longitudinal direction of the first guide rail, and prevents horizontal runout of the mount member;

a second bracing member which is provided on the mount member, retains the mount member in such a manner that the mount member is slidable in a longitudinal direction of the second guide rail, and prevents horizontal runout of the mount member; and

support members which are provided on the first and second guide rails and support vertical load of the mount member and that of the hoisting machine.

2. The mechanism for mounting a hoisting machine according to claim 1, further comprising:

a third bracing member which is provided on a part of the mount member at a lower side of the first bracing member, retains the mount member in such a manner that the mount member is slidable in the longitudinal direction of the first guide rail, andprevents horizontal runout of the mount member; and

a fourth bracing member which is provided on a part of the mount member opposing a lower side of the second bracing member, retains the mount member in such a manner that the mount member is slidable in the longitudinal direction of the second guide rail, and prevents horizontal runout of the mount member.

3. The mechanism for mounting a hoisting machine according to claim 1, further comprising:

resilient members provided between the mount member and the support member.

4. The mechanism for mounting a hoisting machine according to claim 1, further comprising:

a beam which is affixed to the support member and to which one end of the main cable is to be affixed.

5. The mechanism for mounting a hoisting machine according to claim 1, further comprising:

a first stopper which is provided so as to project from the mount member toward the first guide rail and prevents horizontal runout of the mount member upon coming into contact with the first guide rail; and

a second stopper which is provided so as to project from the mount member toward the second guide rail and prevents horizontal runout of the mount member upon coming into contact with the second guide rail.

6. The mechanism for mounting a hoisting machine according to claim 1, further comprising:

a joint member which is provided on an upper end of the first guide rail and that of a second guide rail and links together the first and second rails at a position higher than the mount member.

7. An elevator system comprising:

a car which moves up and down within a hoistway;

a plurality of car guide rails for guiding vertical movement of the car;

a counterweight which moves up and down within the hoistway;

a plurality of counterweight guide rails for guiding vertical movement of the counterweight;

a main cable for suspending the car and the counterweight;

a hoisting machine having a traction sheave around which the main cable is to be passed and a drive section for rotationally driving the traction sheave and causing the car and the counterweight to ascend or descend by way of the main cable by means of rotation of the traction sheave;

a mount member on which the hoisting machine is mounted;

a first bracing member which is mounted on the mount member, retains the mount member in such a manner that the mount member is slidable in a longitudinal direction of the first guide rail selected from the plurality of car guide rails and the plurality of counterweight guide rails andwhich prevents horizontal runout of the mount member;

a second bracingmember which is mounted on the mount member, retains the mount member in such a manner that the mount member is slidable in a longitudinal direction of a second guide rail differing from the first guide rail selected from the plurality of car guide rails and the plurality of counterweight guide rails and which prevents horizontal runout of the mount member; and

a support member which is mounted on the first and second guide rails and supports a vertical load of the mount member and that of the hoisting machine.

Fig. 1

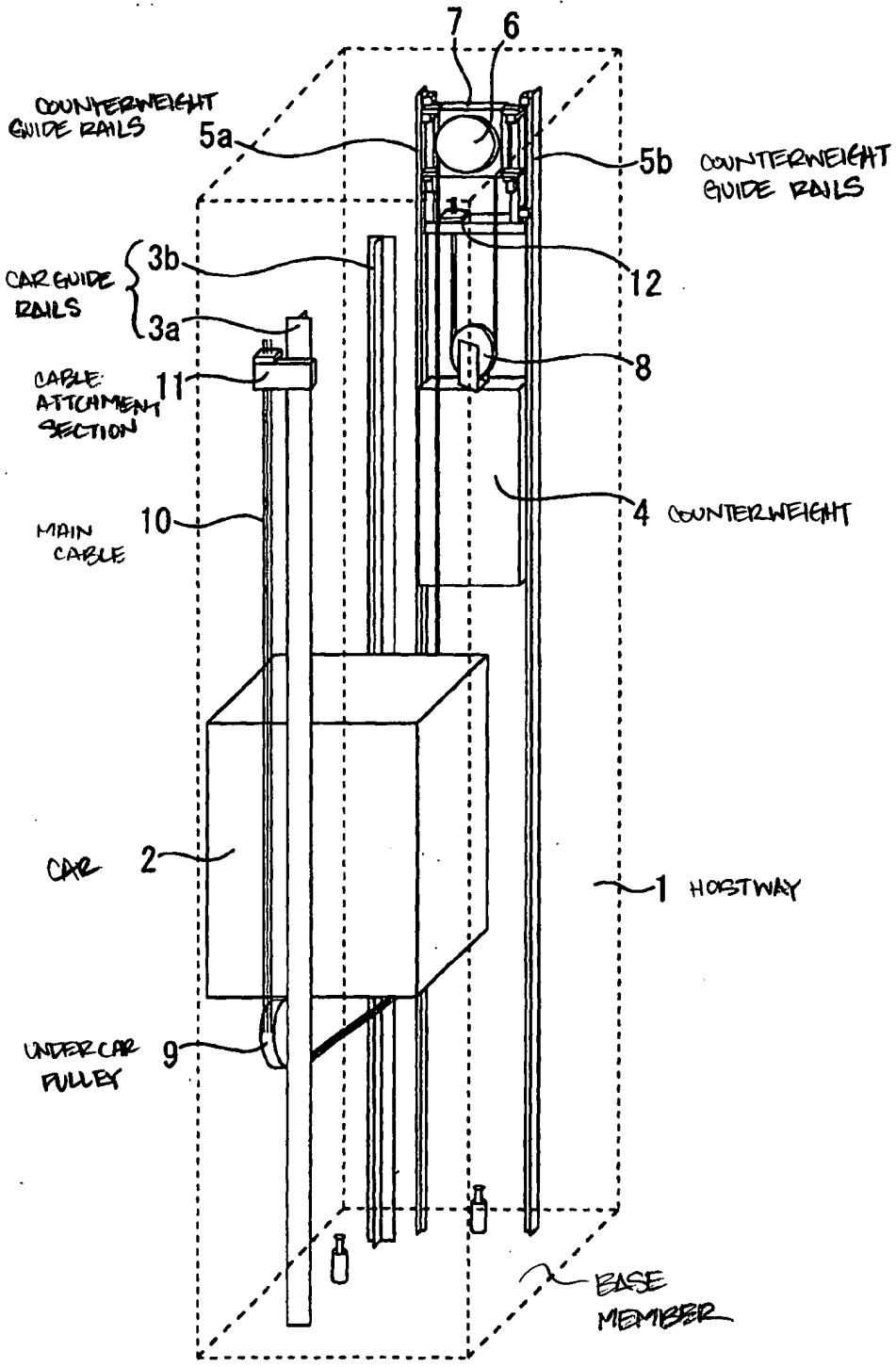

7
6
COUNTERWEIGHT GUIDE RAILS
5a
5b
COUNTERWEIGHT GUIDE RAILS
CAR GUIDE RAILS
3b
3a
12
CABLE ATTACHMENT SECTION
11
8
MAIN CABLE
10
4 COUNTERWEIGHT
CAR
2
1 HOISTWAY
UNDER CAR PULLEY
9
BASE MEMBER

Fig. 2

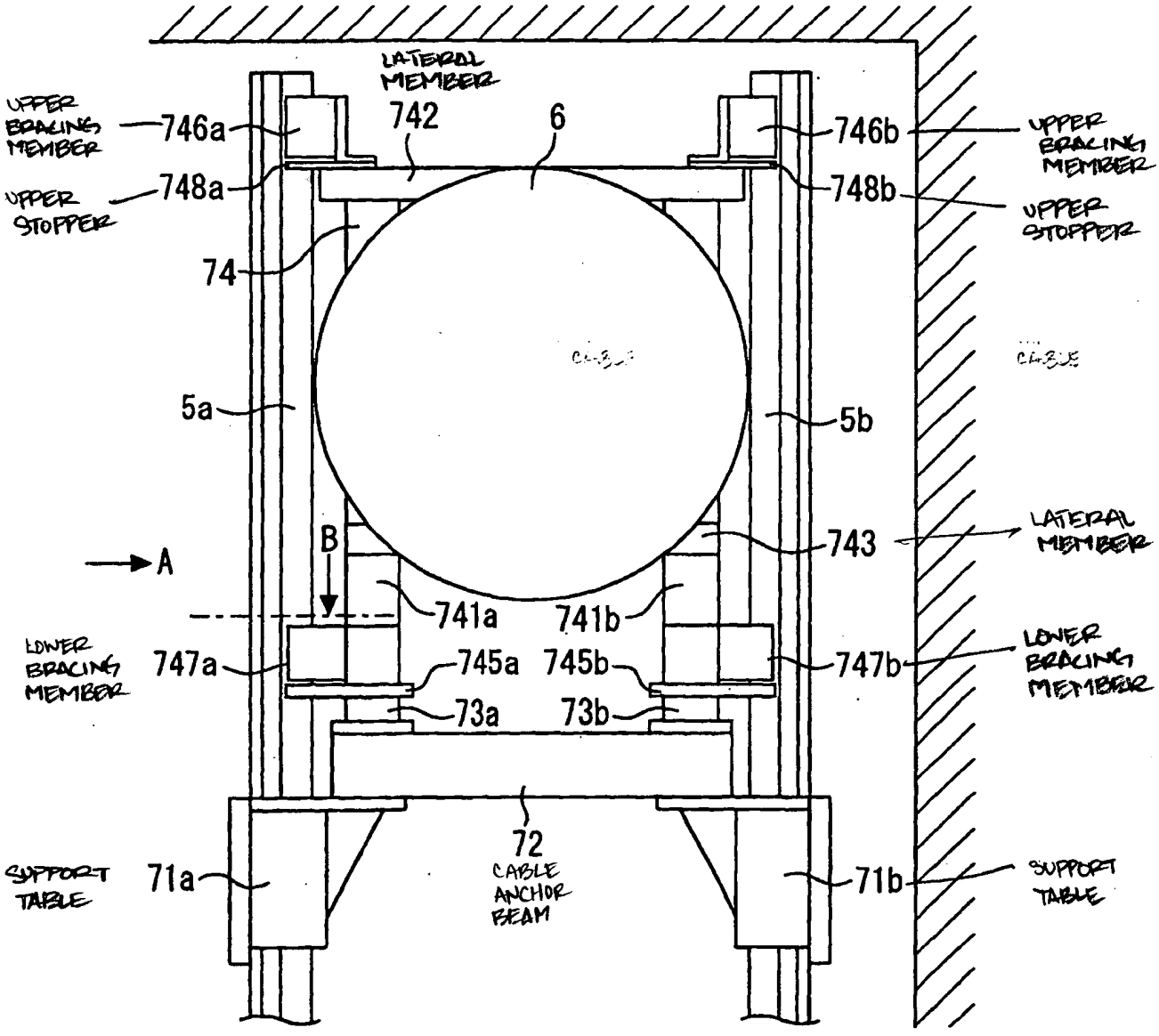

LATERAL MEMBER
742
6
UPPER BRACING MEMBER
746a
746b
UPPER BRACING MEMBER
UPPER STOPPER
748a
748b
UPPER STOPPER
74
5a
5b
B
A
743
LATERAL MEMBER
741a
741b
LOWER BRACING MEMBER
747a
745a
745b
747b
LOWER BRACING MEMBER
73a
73b
72
CABLE ANCHOR BEAM
SUPPORT TABLE
71a
71b
SUPPORT TABLE

Fig. 3

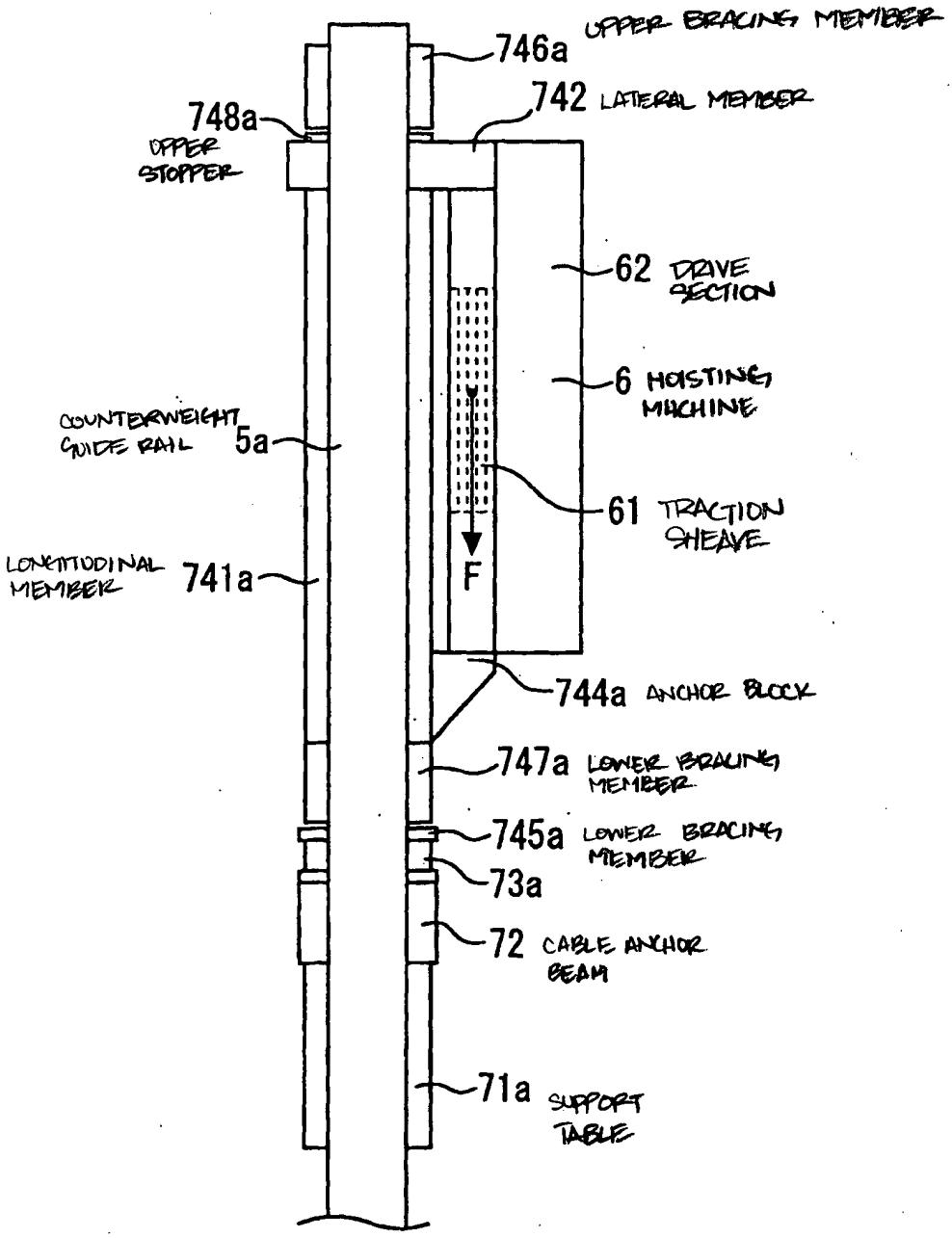

746a
UPPER BRACING MEMBER
742 LATERAL MEMBER
748a
UPPER STOPPER
62 DRIVE SECTION
6 HOISTING MACHINE
COUNTERWEIGHT GUIDE RAIL 5a
61 TRACTION SHEAVE
F
LONGITUDINAL MEMBER 741a
744a ANCHOR BLOCK
747a LOWER BRACING MEMBER
745a LOWER BRACING MEMBER
73a
72 CABLE ANCHOR BEAM
71a SUPPORT TABLE

Fig. 4

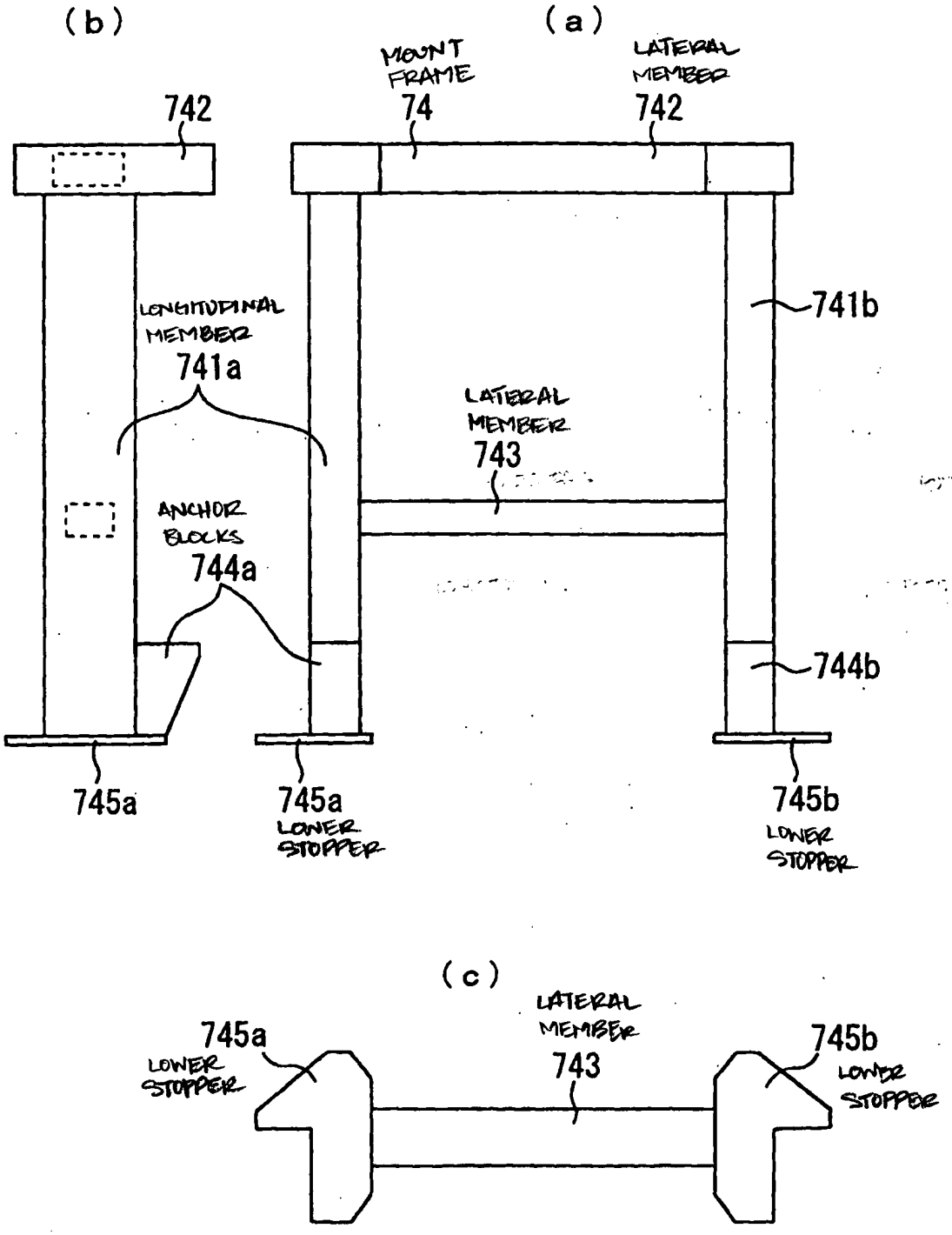

(b)
(a)
MOUNT FRAME
74
LATERAL MEMBER
742
742
741b
LONGITUDINAL MEMBER
741a
LATERAL MEMBER
743
ANCHOR BLOCKS
744a
744b
745a
745a
LOWER STOPPER
745b
LOWER STOPPER
(c)
LATERAL MEMBER
743
745a
LOWER STOPPER
745b
LOWER STOPPER

Fig. 5

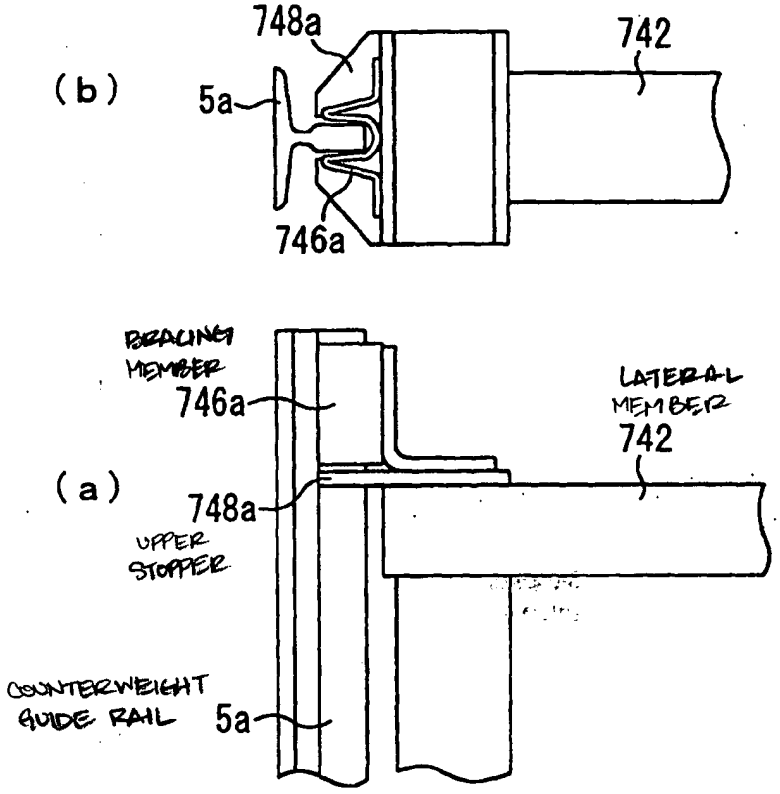

(b)
748a
742
5a
746a
(a)
BRACING MEMBER
746a
LATERAL MEMBER
742
748a
UPPER STOPPER
COUNTERWEIGHT GUIDE RAIL
5a

Fig. 6

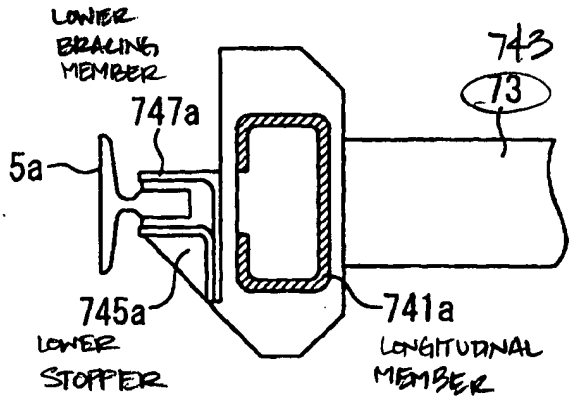

LOWER BRACING MEMBER
747a
5a
745a
LOWER STOPPER
743
73
741a
LONGITUDINAL MEMBER

Fig. 7

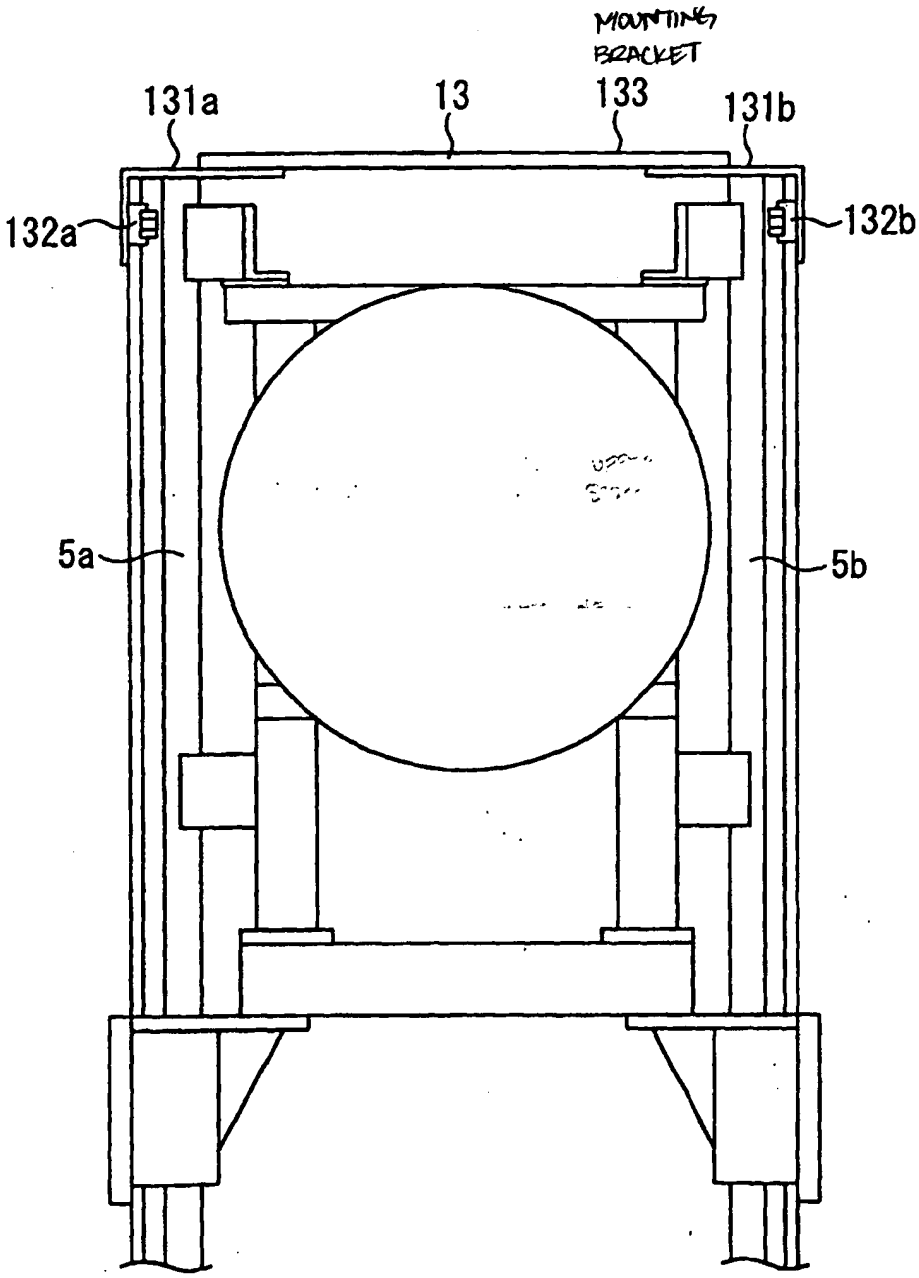


Fig. 8

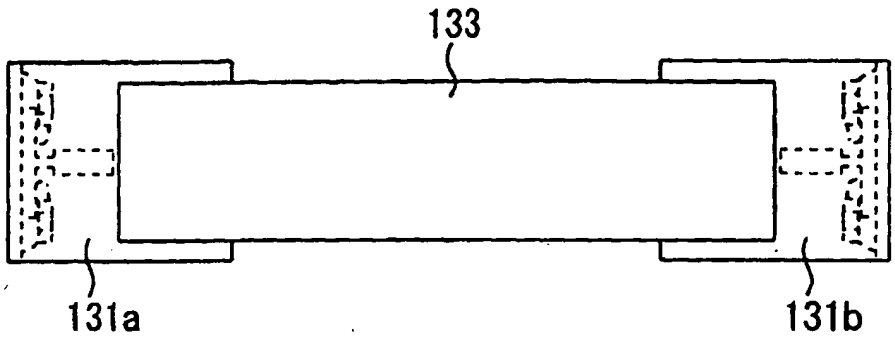
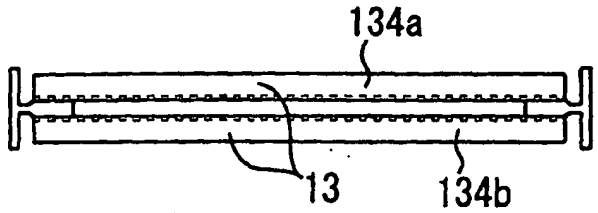


Fig. 9



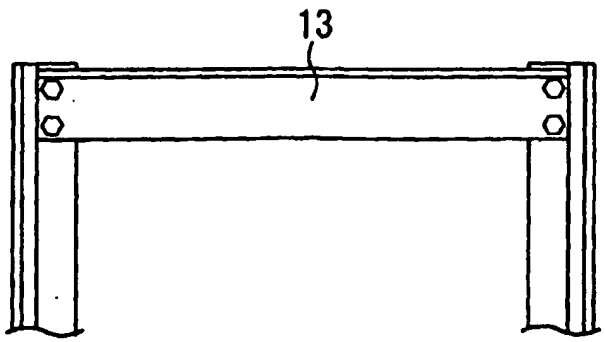
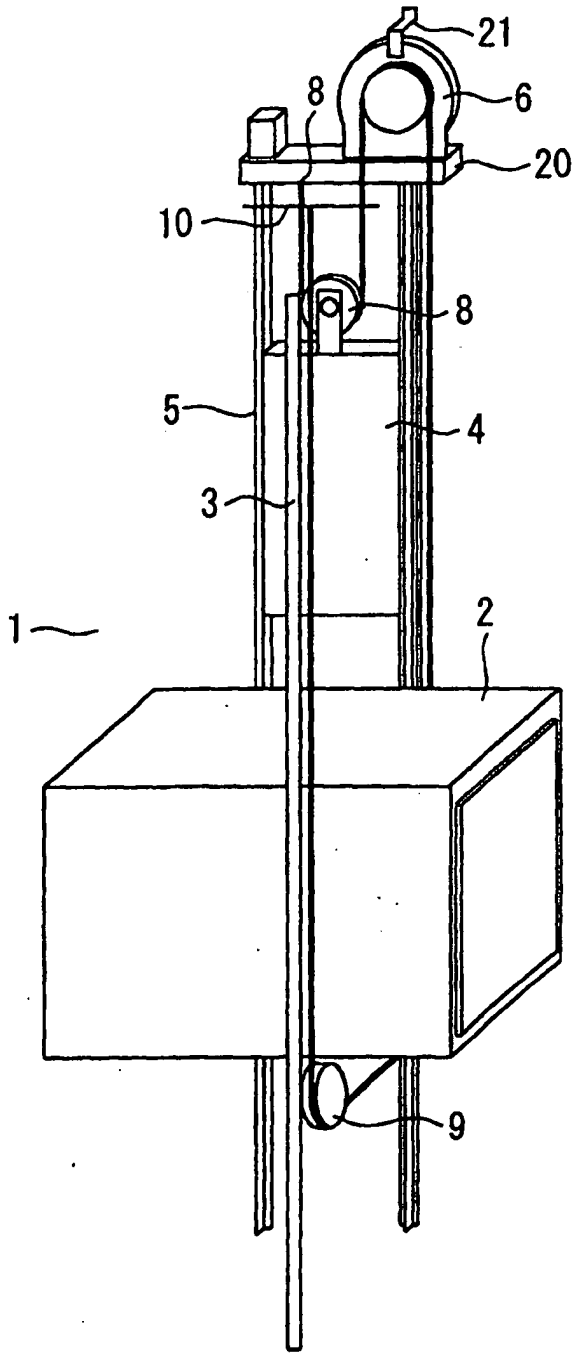
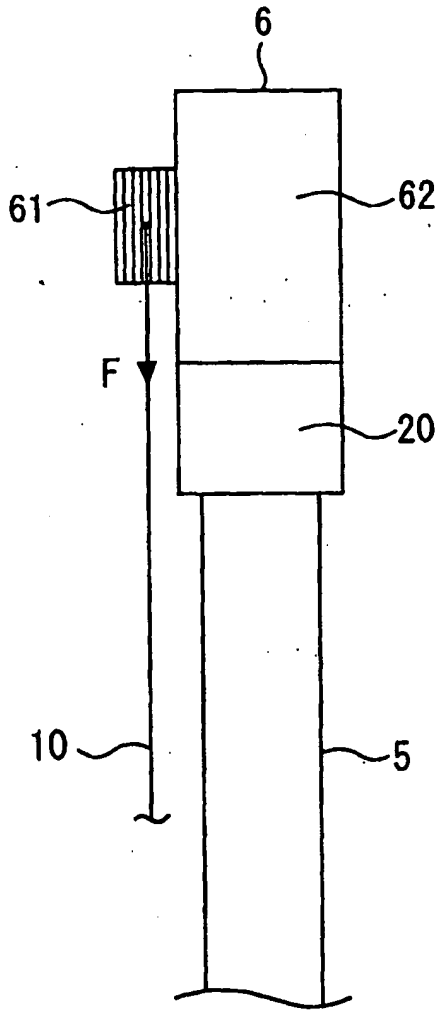


Fig. 10



PRIOR ART

Fig. 11



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP01/02666

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[7] B66B11/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl[7] B66B1/00-B66B11/08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2001
Kokai Jitsuyo Shinan Koho 1971-2001 Toroku Jitsuyo Shinan Koho 1994-2001

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
EA	JP 2001-106461 A (Matsushita Electric Works Ltd.), 17 April, 2001 (17.04.01) (Family: none)	1-7
EA	JP 2001-171953 A (Fujitec Co., Ltd.), 26 June, 2001 (26.06.01) (Family: none)	1-7
EA	JP 2001-171954 A (Mitsubishi Electric Corporation), 26 June, 2001 (26.06.01) (Family: none)	1-7
A	JP 2000-153973 A (Nippon Elevator MFG Co. Ltd.), 06 June, 2000 (06.06.00) (Family: none)	1-7
A	JP 2000-169059 A (Mitsubishi Electric Corporation), 20 June, 2000 (20.06.00) (Family: none)	1-7
A	JP 8-208152 A (Kone OY), 13 August, 1996 (13.08.96), & EP 0710618 A2 & JP 3014952 B2 & FI 96198 C	1-7

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Date of the actual completion of the international search	Date of mailing of the international search report
17 December, 2001 (17.12.01)	25 December, 2001 (25.12.01)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP01/02666

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No.27645/1975 (Laid-open No.109563/1976, (Tokyo Shibaura Denki K.K.), 03 September, 1976 (03.09.76) (Family: none)	1-7
A	JP 3-162384 A (Mitsubishi Electric Corporation), 12 July, 1991 (12.07.91) & JP 2507636 B2	1-7

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